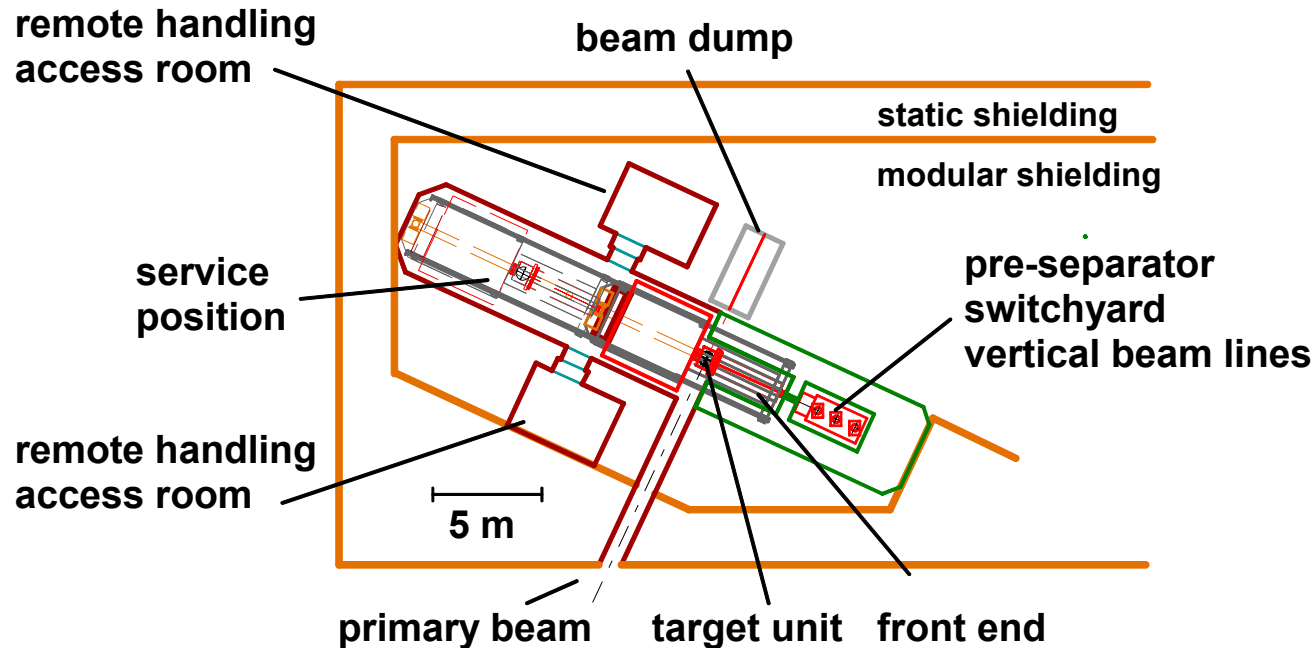


# ISOL Target and Beam Development

G. Bollen, P. Mantica, D. Morrissey, S. Schwarz, L. Weissman  
National Superconducting Cyclotron Laboratory, MSU, East Lansing



- Basic considerations for  $\leq 400$  kW ISOL station
  - Vertical vs horizontal system, shielding, how many stations
  - Target issues & ISOL related R&D at MSU

## ISOL target R&D

High power issues

Production and release

Helge Ravn and Paul Schmor

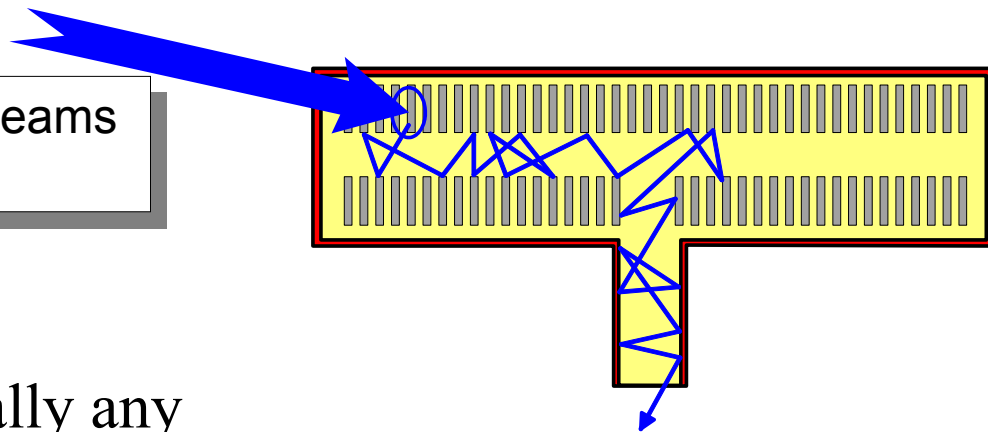


ISOLDE converter test:  
Ta-rod after irradiation with  $6E18$   
protons in  $2.4 \mu s$  pulses of  $3E13$

- Evaluation of **Cooling schemes**
- **Material research:** experimental tests of known and new materials for targets and target containers
- Considering **target options** – solid or liquid metal converters?
- Further development of codes for the **modeling** of target issues
- Design of **prototype targets**
- **Power tests**, study of **release times** of prototype targets and **yield** measurements
- ...
- **Develop tools** that can help to make target development more efficient

## Proposed scheme

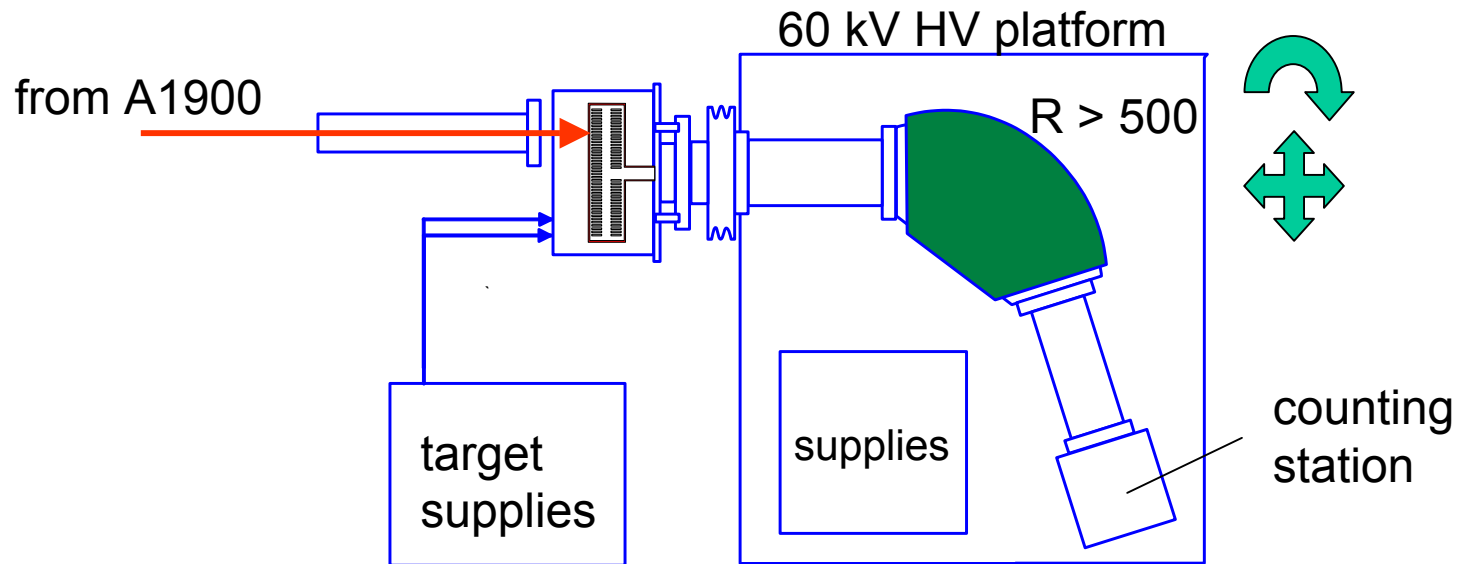
NSCL fast RI beams  
(100 MeV/u)



- Implantation of practically any isotope into target materials, target systems, prototypes ...
- Localized implantation
- Tests very close to realistic conditions if target heated
- Low radiation level and radioactivity build up – **Hands-on** experiments - Fast iterations

Not a replacement of on-line tests but will help to do fast prototyping

# Scenario for an ISOL test station at the NSCL

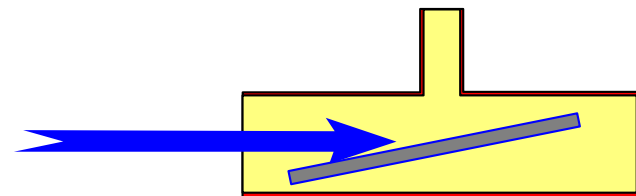


- Flexible front end design for mounting different types of targets
- Mass separator with modest resolving power
- Counting station for RI identification
- Rotation and translation degrees of freedom

## Examples:

- Diffusion and effusion studies (different materials, geometry and temperature)
- Investigation of formation of molecular sidebands  
(\*C + TaO = Ta + \*CO, \*S + Sn = Sn\*S, \*Si + CeS = \*SiS + Ce,  
\*O + C = C\*O, or \*Al + F = \*AlF)
- Disentanglement of long-term effects of temperature and radiation damage on target performance
- Test of RIA target prototypes
- Test of targets used or under development at other ISOL facilities

- Fast fragments for ISOL beam production in parasitic mode
  - Low-power primary beam + fragmentation target or beam from fragment separators
  - Catchers optimized for fast release
  - Not a primary production scheme for RIA, but may enhance facility output



**Fast beams can become a valuable tool for ISOL R&D**

starting at the NSCL and continuing at RIA